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22. Pileus with hairs in stalked pyramidal fascicles. *L. pyramidatus* B. & C.
Pileus not as above. 23.
23. Pileus orange, hairs of two kinds, lanate and rigid. *L. siparius* B. & C.
Pileus cervinous, strigose; stipe farinose above. *L. Nicaraguensis* B. & C.
Pileus fuscous or fulvous. 24.
24. Pileus small (1.25 cm.), membranous-coriaceous, totally covered with short
deciduous fascicled hairs. *L. Leprieurii* Mont.
Pileus 3 cm., fascicles of hairs toward the center, scattered and depressed.
L. sparsibarbis B. & C.
25. Stipe thick, tapering downward, 4-5 cm. \times 5-10 mm. *L. castaneus* Ell. & McB.
Stipe elongated, cylindrical, radicating, reaching 15 cm. \times 3-5 mm.
L. velutinus Fr.
26. Very large; pileus 15 cm., white, fulvous when dry. *L. vellereus* B. & C.
Smaller; pileus 2-6 cm., purplish, then reddish-brown.
L. strigosus (Schw.) Fr. (= *L. Lecomtei* Fr.).

THE PUBESCENCE OF SPECIES OF ASTRAGALUS

BY FRANCIS RAMALEY

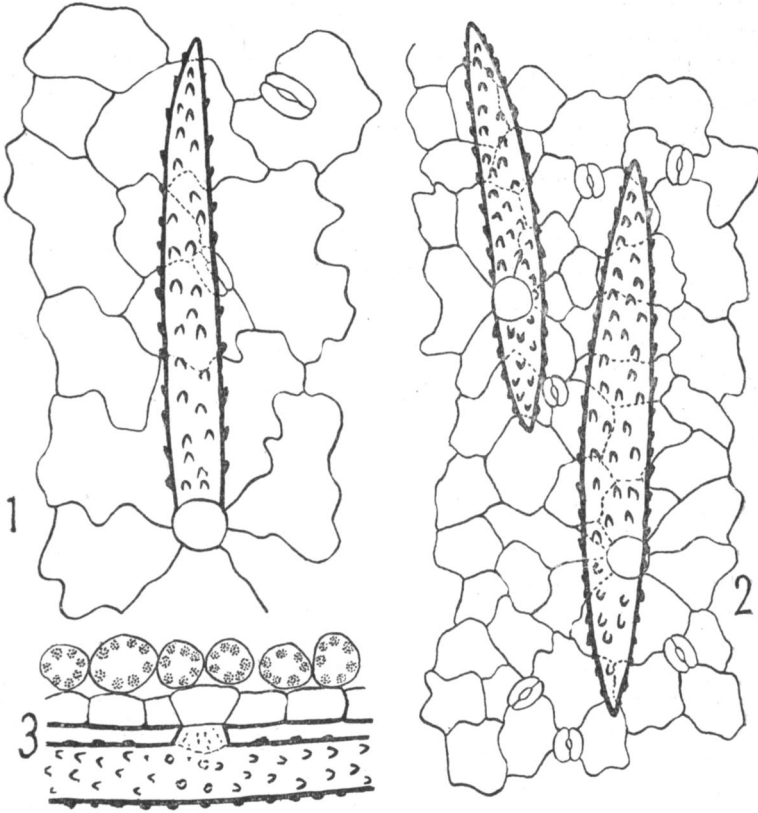
While making a study of leaf anatomy in the genus *Astragalus*, a difference was noted in the character of the trichomes in the different species. There are two kinds of hairs. Both are straight and simple with small basal cell and elongated end cell. In one kind of hair the end cell is straight and tapers to the point. The basal portion is the thickest part of the cell. This is shown in Fig. 1, which is a surface view of the lower epidermis of *Astragalus racemosus* Pursh. In the other kind of hair, the end cell is pointed cigar-shaped and attached some distance from one of the ends. Fig. 2 shows the appearance of these hairs in surface view of the lower epidermis of *A. Carolinianus* L. The mode of attachment will be recognized in Fig. 3, which is from a vertical section of the leaf of the same species. These cigar-shaped, double-pointed hairs are recorded for *Astragalus* by Solereder,¹ but no figure is given in his work. He calls them "two-armed" hairs.

Specimens of eight species were examined by the writer. In each of these eight, so far as might be judged from the material

¹ Syst. Anat. Dicotyledonen, 305. 1899.

studied, only one kind of trichomes was present. Care was taken to examine specimens of each species collected in various localities.

It is quite likely that there are species in which the hairs are more or less intermediate in form between the two kinds here



FIGS. 1-3. Hairs of *Astragalus*.

described. In fact in *A. Carolinianus* some of the hairs have the short "arm" quite short, so that instead of being nearly the length of the longer arm, it is only about one sixth of the length. The hairs shown in Fig. 2 are of about average form for the species.

Since the two kinds of hairs seem to be characteristic for the particular species, it is possible they could be made use of by systematists. The great difficulty of the genus *Astragalus* is

well known and these additional characters might serve to render identification easier. For simple identification of the kind of hair, it is not necessary to make thin sections of the leaf. An entire leaflet, taken from an herbarium specimen, may be placed on a slide and examined dry by reflected light, using the low power of the compound microscope.

Of the species examined, the following have the single-armed hairs: *Astragalus Drummondii* Dougl., *A. alpinus* L., *A. Bigelovii* A. Gray, *A. crassicaarpus* Nutt., *A. flexuosus* (Hook.) Dougl., *A. Hypoglottis* L., *A. junciformis* A. Nelson, *A. racemosus* Pursh. Of these the first three have hairs somewhat longer than the rest and longer than those of *A. racemosus* shown in Fig. 1. Only two of the species examined have the double-pointed hairs. These are *Astragalus adsurgens* Pall. and *A. Carolinianus* L.

The purpose of this note is merely to call attention to these trichomes in the hope that systematists may find them useful.

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SHORTER NOTES

INSECT VISITORS OF SCROPHULARIA. — With reference to Mr. E. W. Berry's notes (TORREYA, 3: 8), it may be said that *Scrophularia* is freely visited in Europe and America by short-tongued bees. On Ruidoso Creek, New Mexico, Professor E. O. Wooton found a *Scrophularia* (I suppose *S. montana*, Wooton) to be freely visited by three species of the bee-genus *Prosopsis*, which I described as *P. Wootoni*, *P. tridentula* and *P. Rudbeckiæ* race *Ruidosensis*. C. Robertson (Trans. St. Louis Acad. 5: 587) cites numerous species of bees, long- and short-tongued, from *Scrophularia* in Illinois. Knuth (Blütenbiologie, 2²: 142 ff) gives a summary of the European records.

T. D. A. COCKERELL.

EAST LAS VEGAS, NEW MEXICO.

SOME INTERESTING HEPATICAE FROM MAINE. — In a collection representing fifteen genera and twenty-one species made in the vicinity of Prospect Harbor, Maine, by Mrs. Alice R. Northrop